ernitec

Installation Instructions
BDR-510/2 & BDR-514/2
Telemetry Receivers

CE

3020-00035

Introduction

The Telemetry Receiver forms the receiver end of a digital remote control system. A digital remote control system is used to control camera functions such as pan, tilt, zoom, focus and iris, light on/off and open/close gates etc..
The digital remote control system has the advantage of long transmission distance and low cable installation cost due to the fact that a standard 2 x 0.6 mm twisted pair cable may be used for the control of all functions.
The Telemetry Receivers BDR-510/2 and BDR-514/2 is designed with special attention to transmission safety and stability.
The BDR-510/2 and BDR-514/2 are addressable, which means that up to 64 units can be controlled via one twisted pair line.
The BDR-510/2 and BDR-514/2 are delivered as self-contained units with a mains change-over switch for selection between 230 VAC and 115 VAC mains voltage.
The BDR-510/2 and BDR-514/2 is housed in an IP65 rated ABS-box and can be used in connection with SYSTEM 500M and SYSTEM 1000M. Besides the BDR-510/2 and BDR-514/2 can be controlled and programmed directly from the keyboards 1500M, 1501M, 1502M, 1503M and 1504M.

RS485 data format

The BDR-510/2 and BDR-514/2 are controlled via the ERNA protocol (Ernitec Asynchronous Serial One-way Camera Control).
The ERNA protocol can be generated from a PC, which means that camera control can be made via the PC's RS-232-C port.
The format of this protocol is as follows (Version 2.0, Release 961016):

Physical format:

Baud rate: 2400
Parity Bit: None
Data Bit: 8
Stop Bit: 1

Frame format:

Header	Address	Command	Data 1	Data 2	Checksum
STX	0-255	1-17	0-255	0-255	Sum of previous bytes
02 Hex	255=Broadcast				

Commands:

Command	Function	Data 1	Description	Data 2	Description	CS Type
1	Relays	0-255	Bit 0 Pan right 1 Pan left 2 Tilt up 3 Tilt down 4 Zoom wide 5 Zoom tele 6 Focus near 7 Focus far	0-255	Bit 0 Iris open 1 Iris close 2 AUX1 3 AUX2 4 AUX3 5 AUX4 6 AUX5 7 AUX6	ALL
2	Call preposition	1-128	Prepos number	----	Not used	Not BDR-51x
3	Start Sequence prepos	0		----	Not used	Not BDR-51x
4	Text on/off	0		----	Not used	BDR-55x
5	Save prepos	1-128	Prepos number	----	Not used	Not BDR-51x
6	Insert prepos in stack	1-128	Prepos number	----	Not used	Not BDR-51x
7	Delete prepos from stack	1-128	Prepos number	----	Not used	Not BDR-51x
8	Clear seq. stack	0		----	Not used	Not BDR-51x
9	Show seq. stack	0		----	Not used	BDR-55x
10	Latch AUX	0-255	Bit 2 AUX1 3 AUX 2 4 AUX 3 5 AUX 4 6 AUX 5 7 AUX 6 Low=Latch High=No latch	----	Not used	BDR-55x
11	Sequence dwell time	0-255	Seconds	----	Not used	Not BDR-51x
12	Homepos	0-255	Prepos number 0=Disabled	0-255	10*1sec time-out	Not BDR-51x and Saturn.
13	AUX on/ off	1-8	Relay number	0-1	0=Off 1=On	Not BDR-51x
14	PT Speed	0-255	Pan Speed	0-255	Tilt Speed	Not BDR-51x
15	Auto-paning	1	Speed	0-255		BDR-575/ICU
		2	Limits	1/2		
		3	Start	0		
16	Camera Set-up	1	Mode	0-255	Bit 0 Gain Ctrl. remote. 1 White bal. remote. 2 Contour corr. remote. 3 Shutter speed remote. 4 Gain auto. 5 White val. auto.	ICU
		2	Gain control.	0-255	0=low 255=high	
		3	White balance.	0-255	0=Warm 255=Cold	
		4	Contour corr.	0-255	0=Sharp 255=Soft	
		5	Shutter speed	0-255	0=Fast 255=Slow	
		6	Background comp.	0	Not used	

Command	Function	Data 1	Description	Data 2	Description	CS Type
17	Alarms	1	Configuration	0-255	Bit 0 Alarm 1 0=NC 1=NO 1 Alarm 2 0=NC 1=NO 2 Alarm 1 relay 0=Off 1=On 3 Alarm 2 0=Off 1=On 4 Alarm 1 priority 0=Low 1=High 5 Alarm 2 0=Low 1=High 6 Alarm 1 0=Disable 1=Enable 7 ALarm 2 0=Disable 1=Enable	ICU
		3	Alarm 1 Set-up	0-255	Bit 0-5 Preposition 6 Relay 1 0=Disable 1=Enable 7 Relay 2 0=Disable 1=Enable	
		2	Alarm 2 Set-up	0-255	Bit 0-5 Preposition 6 Relay 1 0=Disable 1=Enable 7 Relay 2 0=Disable 1=Enable	

Installation

Box Installation

Choose a plane surface to prevent the box from being twisted and thereby becoming leaky while mounted. When mounted outdoor the box should be oriented with the cable glands pointing downwards. Screws and wall plugs are supplied in the mounting kit. Drilling dimensions are shown on figure 2.

Mains installation

The BDR-510/2 or BDR-514/2 should be mounted at a suitable location close to the video camera where mains are available. The BDR-510/2 and the BDR-514/2 can be supplied with either 115 VAC or 230 VAC mains voltage. The mains voltage is selected by the mains voltage change-over switch, refer to figure 2.
The BDR-510/2 or BDR-514/2 must be used with a 3-wire mains connection (2W+PE @ min. 0,75mm^2).
Details on the mains supply can also be found on a label fitted inside the lid of the BDR-510/2 and BDR514/2.
Terminals marked with hazardous live symbol requires installation by an instructed person.
If permanently connected to mains, a readily accessible disconnect device shall be incorporated in the building installation wiring.
If pluggable connection to mains, the socket-outlet shall be installed near the equipment and shall be easily accessible .

Cable connections

It is of utmost importance that all cable connections are carried out, exactly as described, in order to avoid malfunction or damage to the Telemetry Receiver or the connected equipment.
All cables to and from the Telemetry Receiver are fed through the cable glands. Choose an appropriate size gland for the actual cable and tighten the glands when all cables are connected. The choice of cable is important to the optimal function of the Telemetry Receiver.

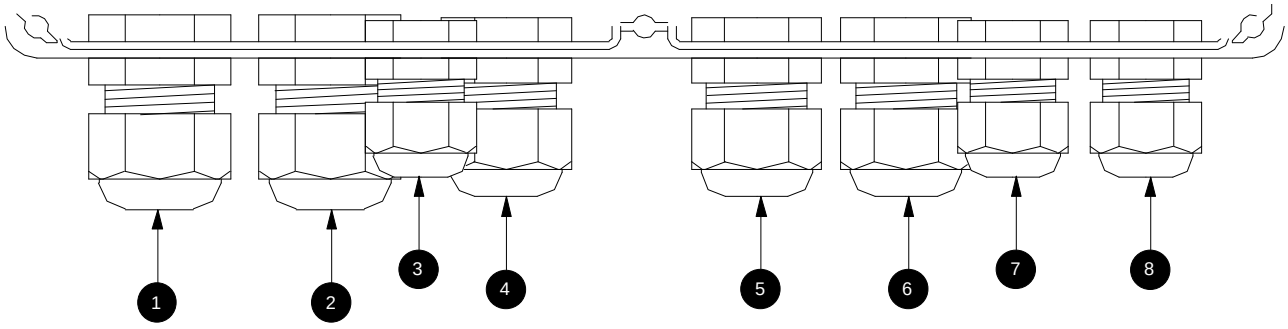

Figure 1, Cable glands layout

The following table shows how the cable glands are intended to be used:

No.	Size	Description
1	PG 13.5	Mains input cable
2	PG 13.5	Pan/Tilt connection cable
3	PG9	Mains output cable
4	PG 11	Auxiliary 1 connection cable
5	PG 11	Auxiliary 2 connection cable
6	PG 11	Zoom lens control cable
7	PG 9	RS485 input cable

8	PG 9	RS485 output cable

CE/Safety

All electronic equipment can emit or be sensitive to induced electromagnetic noise, which can be conducted by the connected wires or transmitted as electromagnetic fields. Electromagnetic noise can cause malfunction or damage to the equipment.
The Series BDR-510/2 - BDR-514/2 are tested to, and fulfils, the following EMC standards:

EN 50081-1 (Emission)
EN 50130-4 (Immunity)

These standards covers equipment placed in an industrial environment.

The Series BDR-510/2 - BDR-514/2 fulfils the following safety standard:

IEC 60950

BDR-510/2 - BDR-514/2 Layout

The BDR-510/2 and BDR-514/2 have been designed for easy installation and set-up. Figure 2 shows the layout of the Telemetry Receiver.

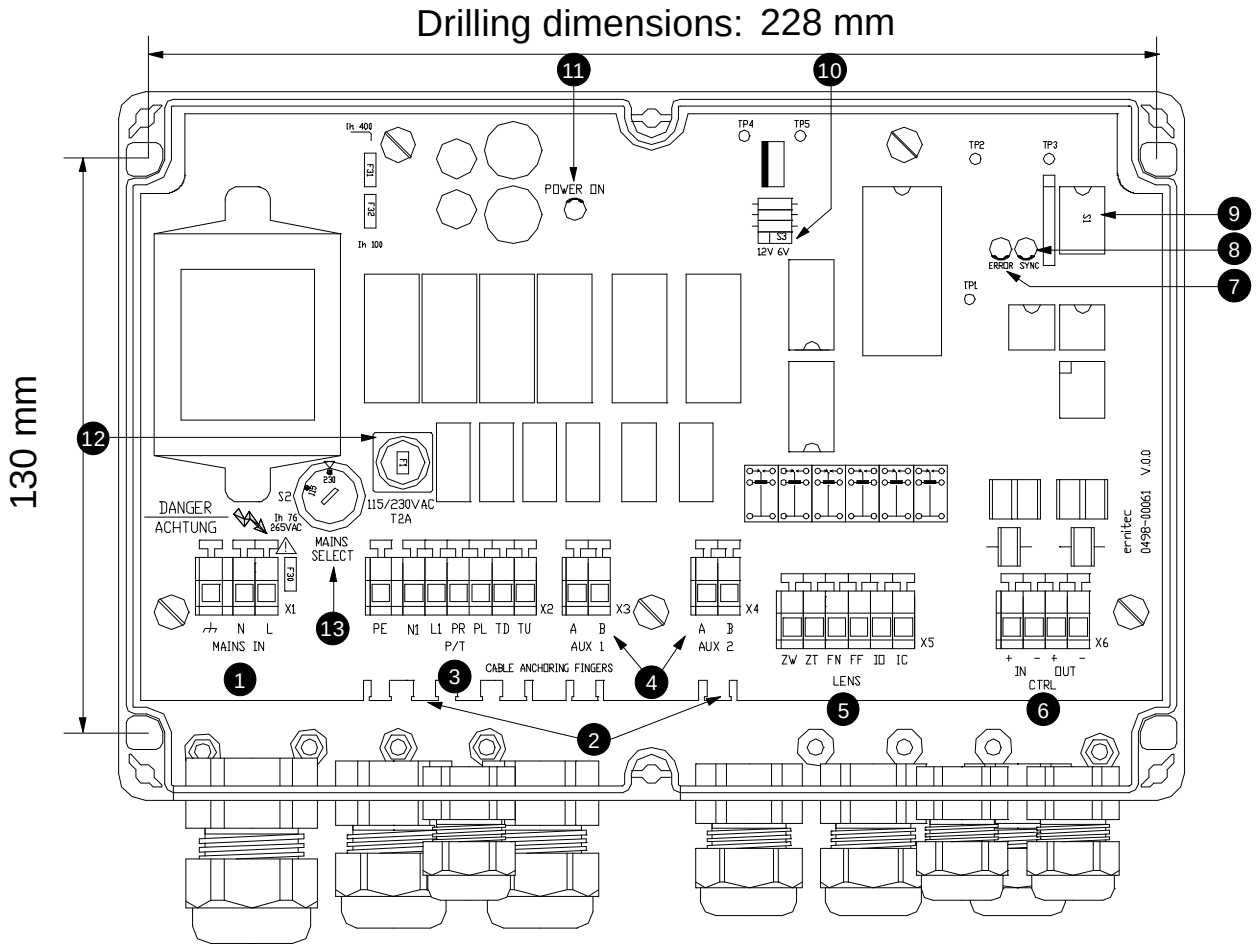

Figure 2, BDR-510/2-BDR-514/2 Layout

	Description	
No.	**BDR-510/2**	**BDR-514/2**
1	Mains input with functional earth (115/230VAC)	
2	'Cable Anchoring Fingers'. Use *Cable Ties* to secure high voltage cables to the PCB.	
3	Pan/Tilt output (115/230VAC)	Auxiliary connection AUX 3-6 (115/230VAC)
4	Auxiliary connection AUX 1 & 2 - Potential free relay contacts.	
5	Lens drive outputs (6/12VDC)	
6	RS485 Camera control input/output	
7	RS485 error detection: The red LED should always be OFF. If the red LED is constantly ON, the polarity of the RS485 data input(6) may be wrong (± swapped). If the red LED flashes, corrupt RS485 data is received, or the RS485 baud rate is wrong (should be 2400bps).	
8	RS485 data detection: The green LED flashes when RS485 data is received, and is solid when no data is received. If the green LED is OFF, the polarity of the RS485 data input(6) may be wrong (± swapped).	
9	Address switch	
10	6 or 12VDC lens drive voltage selection	
11	Power on indication	
12	Fuse for Pan/Tilt	Fuse for AUX 3-6
13	Mains voltage selection switch 115/230 VAC	

Mains connection

In order to fulfil the safety standard (IEC 60950), the mains cable must be routed via the provided cable clip inside the BDR-510/2 box. Figure 2a, shows how the mains cable should be routed.

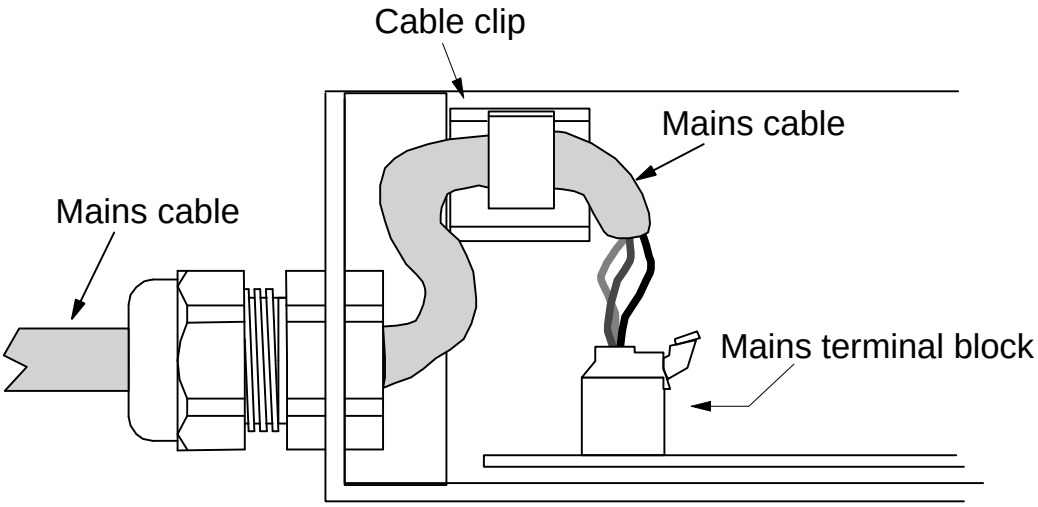

Figure 2a, mains cable clip

Connect the mains lead to the terminal block X1. Refer to figure 3.
Make sure that the Mains Selection switch (S2) is set to match the local mains supply (115VAC or 230VAC).

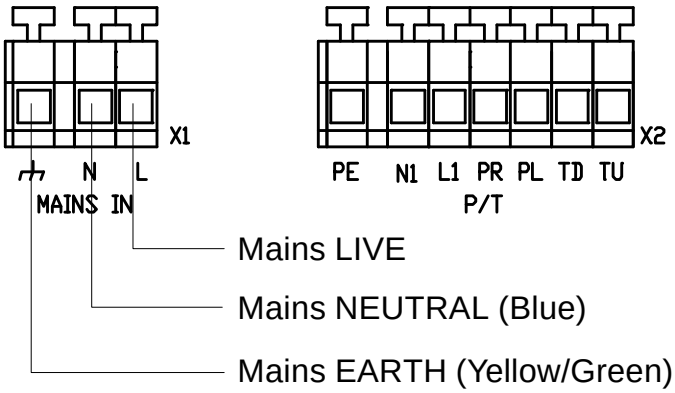

Figure 3, Mains connection

Make sure that each terminal is connected to the corresponding terminal of the mains outlet (i.e. Phase to Phase, Neutral to Neutral and Earth to Earth). Otherwise malfunction or even damage to the Telemetry Receiver will occur.
For specification of mains, refer to *Specifications* at the end of these instructions.

Pan/Tilt connection (Only BDR-510/2)

A high voltage Pan/Tilt is connected to the terminal block X2. Refer to figure 4.

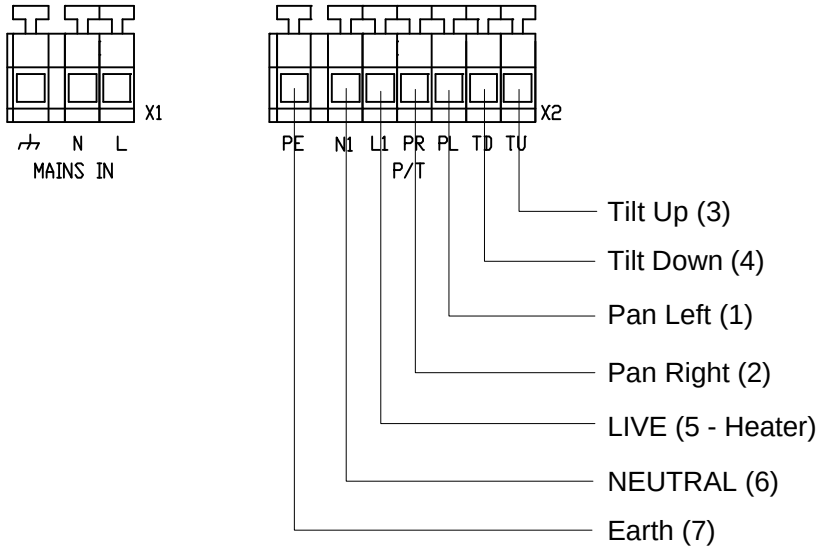

Figure 4, Pan/Tilt connection

The numbers in () indicates the pin number of the MPT-1/10 Pan/Tilt. For further information, refer to the Pan/Tilt Installation Instructions.
When using high voltage Pan/Tilt always connect the EARTH wire.

Auxiliary connection

The auxiliary functions connected to terminal X3 and X4, allows control of mains supplied equipment, or equipment supplied with an external voltage, like 24 VDC. Refer to *Specifications* for maximum load of the relay contacts.

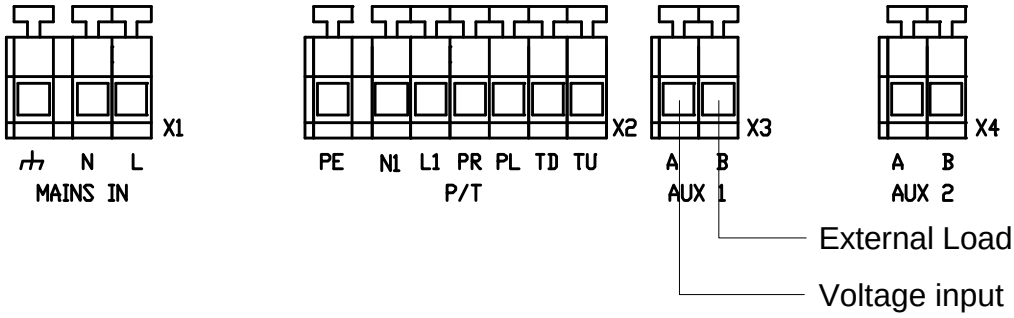

Figure 5, Connection of external supplied Auxiliary Equipment

Be careful not to exceed the maximum rating of the relays, refer to *Specifications* for maximum load of the relay contacts.

Auxiliary connection AUX 3-6 (only BDR-514/2)

The pan/tilt relays are used as auxiliary relay contacts. The *PR* relay is activated by the AUX 3 function, *PL* by AUX 4, *TD* by AUX 5 and *TU* by AUX 6.

Motorised Lens connection

The Motorised lens is connected to terminal X5, see figure 7

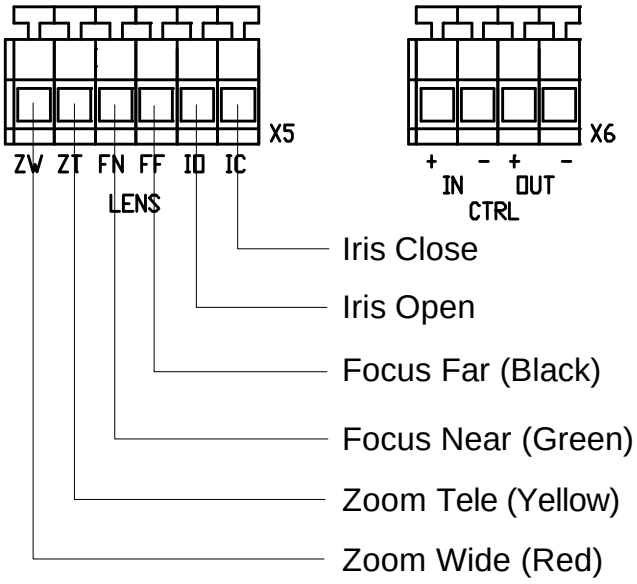

Figure 7, Connection of motorised lens

The colours in () indicates the colour codes used on the Ernitec Series Q, Motorised Zoom lenses.

RS485 Camera control input connection

The RS485 signal is connected to terminal X6, refer to figure 8.
It is important that the polarity of the connection is correct, otherwise it will not be possible to get control.
Note, the RS485 input is galvanic separated from the rest of the circuit in order to avoid ground loop problems.
DO NOT CONNECT THE SCREEN FROM THE CABLE TO THE TELEMETRY RECEIVER EARTH/GROUND.

RS485 Camera control output connection

The RS485 output signal is connected to terminal X6, refer to figure 8. In case of power failure the RS485 signal will be routed to the next Telemetry Receiver via a by-pass relay.

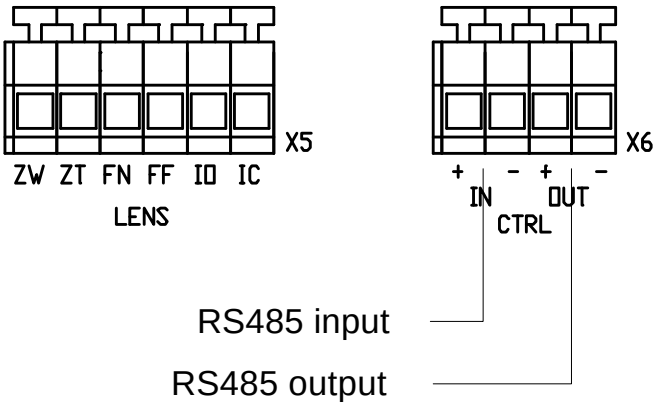

Figure 8, RS485 Camera control input and output

Adjustment and Settings

The BDR-510/2 series has been designed for easy installation and set-up. All settings is made via switches or jumpers. Figure 9 shows where the different switches and jumpers are located:

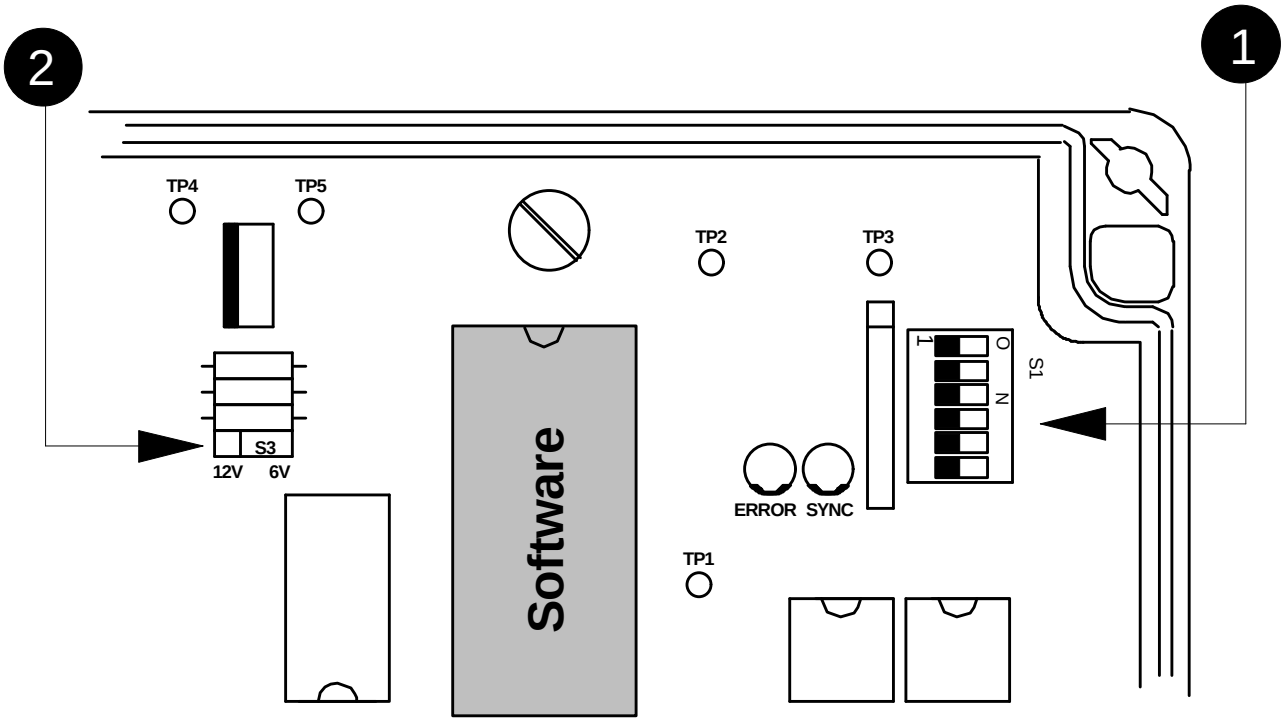

Figure 9, Jumper and switch layout.

Address settings (1)

With the BDR-510/2 series it is possible to address up to 64 units on one twisted pair line:

	Switch S1					
Description	**1**	**2**	**3**	**4**	**5**	**6**
Address number "0"	ON	ON	ON	ON	ON	ON
Address number "1"	ON	ON	ON	ON	ON	OFF
Address number "2"	ON	ON	ON	ON	OFF	ON
Address number "3"	ON	ON	ON	ON	OFF	OFF
Address number "4"	ON	ON	ON	OFF	ON	ON
Address number "5"	ON	ON	ON	OFF	ON	OFF
Address number "6"	ON	ON	ON	OFF	OFF	ON
Address number "7"	ON	ON	ON	OFF	OFF	OFF
Address number "8"	ON	ON	OFF	ON	ON	ON
Address number "9"	ON	ON	OFF	ON	ON	OFF
Address number "10"	ON	ON	OFF	ON	OFF	ON
Address number "11"	ON	ON	OFF	ON	OFF	OFF
Address number "12"	ON	ON	OFF	OFF	ON	ON
Address number "13"	ON	ON	OFF	OFF	ON	OFF
Address number "14"	ON	ON	OFF	OFF	OFF	ON
Address number "15"	ON	ON	OFF	OFF	OFF	OFF
Address number "16"	ON	OFF	ON	ON	ON	ON
Address number "17"	ON	OFF	ON	ON	ON	OFF
Address number "18"	ON	OFF	ON	ON	OFF	ON

Address number "19"	ON	OFF	ON	ON	OFF	OFF
Address number "20"	ON	OFF	ON	OFF	ON	ON
Address number "21"	ON	OFF	ON	OFF	ON	OFF
Address number "22"	ON	OFF	ON	OFF	OFF	ON
Address number "23"	ON	OFF	ON	OFF	OFF	OFF
Address number "24"	ON	OFF	OFF	ON	ON	ON
Address number "25"	ON	OFF	OFF	ON	ON	OFF
Address number "26"	ON	OFF	OFF	ON	OFF	ON
Address number "27"	ON	OFF	OFF	ON	OFF	OFF
Address number "28"	ON	OFF	OFF	OFF	ON	ON
Address number "29"	ON	OFF	OFF	OFF	ON	OFF
Address number "30"	ON	OFF	OFF	OFF	OFF	ON
Address number "31"	ON	OFF	OFF	OFF	OFF	OFF
.....use binary code to calculate						
Address number "62"	OFF	OFF	OFF	OFF	OFF	ON
Address number "63"	OFF	OFF	OFF	OFF	OFF	OFF

12 V or 6V Lens voltage (2)

The voltage to the motorised zoom lens can be set with Jumper S3.

- Jumper on Pin 1 and 2 = 12 VDC
- Jumper on Pin 2 and 3 = 6 VDC

Specifications

Specifications						
Description	**Parameter**	**Min.**	**Typ**	**Max.**	**Unit**	**Note**
Inputs	RS485 (ERNA)	2,5		12	V_{pp}	
Outputs	RS485 (ERNA)		6		V_{pp}	
	Lens Voltage	6		12	VDC	
	Lens Current			150	mA	per function.
	Pan/tilt Voltage			250	VAC	
	Pan/tilt Current, total consumption			2	A	total, fused.
	AUX 1 - AUX 2 voltage			250 24	VAC VDC	
	AUX 1 - AUX 2, max. current			5	A	NOT fused.
General	Mains input 115VAC	104	115	126	VAC	115/230VAC selectable
	Mains input 230VAC	207	230	253	VAC	115/230VAC selectable
	Mains frequency	45		60	Hz	
	Current consumption (@115VAC)			75	mA	
	Current consumption (@230VAC)			40	mA	
	Temperature range	-15		55	ºC	
	Relative humidity			95	%	Non-condensing
	EMC/EMI	EN 50081-1 EN 50130-4				
	Safety	IEC 60950				
	Enclosure	IP 65				ABS box.
	Dimensions (excl. cable glands)	250 x 160 x 90			mm	
	Weight	1,2			Kg	

HEAD OFFICE: ERNITEC A/S, HØRKÆR 24, P.O. BOX 720, DK-2730 HERLEV, DENMARK
TELEPHONE: +45 44 50 33 00, TELEFAX: +45 44 50 33 33
HOMEPAGE: http://www.ernitec.dk, E-MAIL: ernitec@ernitec.dk
UK OFFICE: ERNITEC UK, GERRARD HOUSE, WORTHING ROAD, EAST PRESTON, WEST SUSSEX BN16 1AW, ENGLAND
TELEPHONE: 01903 77 27 27, TELEFAX: 01903 77 27 07
E-MAIL: sally@ernitec-uk.co.uk
GERMAN OFFICE: ERNITEC GmbH., STORMARNRING 28, 22145 STAPELFELD, GERMANY
TELEPHONE: (040) 6756 25 0, TELEFAX: (040) 67 56 25 25
E-MAIL: ernitec@aol.com
FRENCH OFFICE: ERNITEC FRANCE, N° 29 PARC CLUB DU MILLENAIRE, 1025 RUE HENRI BECQUEREL, 34036 MONTPELLIER CEDEX 1, FRANCE
TELEPHONE: (4) 67 15 10 15, TELEFAX: (4) 67 64 01 81
E-MAIL: ernitec@ernitec.fr
MIDDLE EAST OFFICE: ERNITEC ME, HAMRA-MAKDESI STR., YOUNIS CENTER-5th FLOOR, OFFICE NO. 503
P.O. BOX 113/5721, BEIRUT, LEBANON TELEPHONE: +961 1 751 796, TELEFAX: +961 1 751 795
HOMEPAGE: http://www.ernitecme.com, E-MAIL: malek_kabrit@ernitecme.com